STAND ALONE INTEGRATED CUSHION

Field of the Invention

The present invention is directed to a cushion unit capable of having a portion of the cushion raised and lowered in relation to at least other portions of the cushion.

Background of the Invention

Gaymar Industries, Inc., the assignee of this application, is a manufacturer of cushion like devices. These cushions which have at least one bladder are designed to contain fluids. In many cases the fluid is aqueous solutions and/or air. These cushions are used as seat cushions, mattresses, overlays and any other cushion designed to have a patient positioned thereon. Most of the cushions made by Gaymar are designed for therapeutic purposes.

Inflatable therapeutic cushions for patients have been known for many years. Many therapeutic cushions are designed to reduce "interface pressures"; the pressure encountered between a cushion and a patient's skin positioned on the cushion. It is known that interface pressures can significantly affect the well-being of immobile patients in that higher interface pressures can reduce local blood circulation, tending to cause bed sores and other complications. With inflatable cushions, such interface pressures depend (in part) on the air pressure within the inflatable support cushions.

There are numerous types of inflatable cushion designs. These designs have combinations of bladders that can (1) vibrate, (2) rotate, (3) create wave motions, (4) provide percussion, (5) provide support, and (6) combinations thereof (hereinafter referred to as "Objectives") to a user of the cushion. These designs have been incorporated in numerous cushion designs by Gaymar Industries, Inc. as of the filing of this application.

In particular, those cushion designs have been used in numerous Gaymar mattress systems. Those mattress systems 200, as illustrated in Figure 1, have at least one inflatable bladder capable of performing an Objective 210, a control unit 220, and a conduit 230 that interconnects the control unit 220 to the inflatable bladder(s) 210. The control unit 220 can be outside the mattress system 200 (not shown) or within the mattress system 200, as illustrated in Figure 1. For purposes of this application, we will only address those mattress systems that have

the control unit within the mattress system.

We are making this limitation because the present invention is directed solely to self-contained mattress systems. Self-contained mattress systems are preferred in hospital settings because they are easier to clean -- no disconnecting of hoses from the control unit and the bladder(s).

Self-contained mattress systems have the control unit 220 normally and preferably at the foot of the system 240, a plurality of bladders 210 designed to accomplish at least one Objective, and a plurality of conduits 230 that interconnect the bladders 210 to the control unit 230. In all prior Gaymar mattress systems and those known to Gaymar, there is a single control unit 220.

That single control unit 220, as illustrated in Figure 2, has a plurality of input keys 221 interconnected to at least a microprocessor 222. That microprocessor 222 is at least interconnected to pumps, fans, valves and/or switches 223 that push, pull and/or allow (by potential energy contained in the bladder(s)) a fluid through the conduits 230 and the bladder(s) 210. The fluid is contained within a reservoir and/or ambient environment 224. In any case, the fluid is used in the respective bladder to obtain the desired Objective.

There are numerous problems with such self-contained mattress systems 200. One of these problems is that such mattress systems can remain horizontal 201 and/or incline from the horizontal position 201 to about a 45° incline 202 relative to the horizontal position 201 and from a bend point 203. The mattress systems with the above-identified technology is unable to effectively and reliably continue to obtain the Objectives and simultaneously convert the mattress system from a horizontal position to a chair-like position (having an angle greater than 75° (line 75) and less than 180° (line 180) relative to the horizontal position and taken from the bend point 203, and hereinafter referred to as the "Conversion").

Conventional mattress systems are unable to reliably make the Conversion because the one control unit, normally positioned at and/or near one of the ends 235, 240, has a plurality of conduits extending the length (L) of the mattress system 200. When the mattress system is converted from the horizontal position 201 and/or the inclined position 201 to a chair like conformation (greater than 75°) the conduits 230 kink, become deformed, and do not properly transfer the desired amount of fluid to the bladder(s) 210. And if the bladder(s) 210 fail to

receive the desired amount of fluid, the bladder(s) 210 do not complete its Objective.

The present invention solves this problem and others.

Summary of the Invention

The present invention is directed to a stand alone integrated mattress. The system has a self-contained mattress unit, at least one inflatable bladder, at least one fluid source, at least one dispersion unit and at least one control unit. The self-contained mattress unit has at least a head section and a foot section, and is capable of converting from a horizontal position or an inclined position to a chair-like conformation. There is at least one inflatable bladder in each section of the self-contained mattress unit. There is also at least fluid source. In addition there is at least one dispersion unit in each section and each dispersion unit provides a fluid, obtained from the fluid source, to a conduit which directs the fluid into the inflatable bladder positioned in the section of the dispersion unit. The control system is positioned in one of the sections and interconnected to each dispersion unit to control the dispersion of the fluid to the inflatable bladders in each section.

Brief Description of the Drawings

Figure 1 is a prior art illustration of a conventional inclinable and/or horizontal mattress system.

Figure 2 is a prior art schematic of how the mattress system of Figure 1 operates.

Figure 3 illustrates the present invention.

Figure 4 illustrates the schematic of how the present invention operates.

Figures 5a-e illustrate alternative embodiments of the present invention.

Detailed Description of the Present Invention

The present invention is directed to a mattress system 10 capable of being converted from the horizontal position 201 to a chair-like position 205, which has an angle of greater than 75° relative to the horizontal position 201 and the bend point 203. That in itself is not novel. There are plenty of such Conversion mattress systems and the mechanics of how the system moves

from one position to another position is well known to those of skill in the art and therefore is not a part of the scope of this application. None of the conversion mattress systems, however, are self-contained systems that use inflatable bladders. The reasons are simple, self-contained mattress systems that use conduits kink, and disrupt the fluid dynamics in the conduits 230 to the inflatable bladders 210. That problem is solved by the present invention.

The present Conversion mattress system 10 has at least two inflatable bladders 210a, 210b and each is capable of performing an Objective, the same or different. The first inflatable bladder 210a is located at and/or between the distal end 235 and at least one of the bend point(s) 203; while the second inflatable bladder 210b is located at and/or between the proximal end 240 and at least one of the bend point(s) 203. The inflatable bladders 210a, 210b are capable of performing the Objective when each inflatable bladder receives a fluid. Each inflatable bladder 210a, 210b receives the fluid through a conduit 230a,b from at least one of two fluid dispersion units 227a, 227b. The fluid is obtained from a reservoir 224a,b. The reservoirs 224a,b can be the same or different and can provide the same or different fluids. The fluids can be an aqueous solution and/or a gas, like air.

The dispersion units 227a is positioned at or near the distal end 235, and the dispersion unit 227b is positioned at or near the proximal end 240. They are positioned near the ends 235, 240 because the normal human being who will be using the Stand alone integrated mattress system 10 applies and receives the least amount of pressure at these positions.

By having two dispersion units 227a,b the present invention (1) decreases the length of the conduit 230a,b to the respective bladder(s) 210a,b from the dispersion unit 227a,b, (2) generates less vibration, heat, and noise (less distance to push and/or pull the fluid), (3) decreases the chances of kinks and air occlusion in the conduits 230a,b, and (4) increases the reliability of the inflatable bladders 210a,b in the self-contained with inflatable bladder stand alone integrated mattress system 10. The two dispersion units 227a,b are interconnected together through a control system 229. The control system 229 merely incorporates the input system 221 and the microprocessor unit 222 of the conventional control unit 220. Except in the present system 10, the control system 229 transmits its signals that control the units 223a,b through respective transmission lines 228a,b. Transmission lines 228a,b can become kinked and not adversely

affect (1) the transmission of the signal from the microprocessor 222 to the dispersion units 227a,b, and (2) the operation of the system 10 when it converts from the horizontal position 201 to anything up to and including the chair-like position 205. Obviously, the control system 229 can be incorporated with the either dispersion unit 227a or dispersion unit 227b. Alternatively, each dispersion unit 227a,b could have control system 229, but that is undesired because it increases the cost of the unit and the technical ability to operate the system.

In addition, the input system 221 can have various designs. The input system 221 can be an integrated part of a control system box 229a which contains at least the microprocessor 222 and possibly the dispersion units 227a,b, as illustrated in Figure 5a. This type of system is commonly used in conventional self-contained incline mattress systems, Figure 1. The input system 221 can be electrically hinged 250 to the system box 229a, as illustrated in Figure 5b. Alternatively, the input system 221 can be electrically tethered 255 to the system box 229a, as illustrated in Figure 5c. In another embodiment, the input system 221 can be electronically slaved to the system box 229a. An example of being electrically slaved to the system box 229a includes and not limited to the input system 221 having a daughter SIMM board unit 270 extending from therefrom that is keyed only to fit into a particular SIMM socket 272 of control box 229a, and a master SIMM socket 274 to reprogram through a computer system 99, if necessary, the input of the input unit 221, as illustrated in Figure 5d. It is understood that the mattress system 10, 200 will not operate if the input unit 221 is not installed in the particular SIMM socket 272. Another alternative embodiment, has the input unit 221 transmit a conventional remote signal 281, like rf or ir, to a respective receiver 280 on the control box 229a, as illustrated in Figure 5e.

While the preferred embodiment of the invention has been illustrated and described, it will be clear that the invention is not so limited. Numerous modifications, changes, variations, substitutions and equivalents will occur to those skilled in the art without departing from the spirit and scope of the present invention as defined by the appended claims.